


Headquarters U.S. Air Force Auxiliary
Performing Missions for America

**Advanced
Technologies Initiatives**




**U.S. AIR FORCE
AUXILIARY**

*Col Drew Alexa, CAP
National Coordinator
Advanced Technologies*


This Briefing Is:
UNCLASSIFIED

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 **CAP ATG Programs**


- ◆ **ARCHER-Hyperspectral Imaging (HSI)**
- ◆ **Visual Computing Network (VCN)**
- ◆ **Satellite Digital Imaging System (SDIS)**

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 **Program Funding**

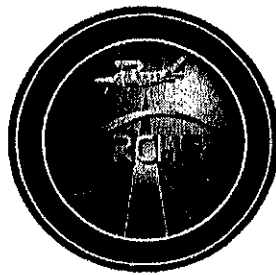
- ◆ **Programs funded by Congress**
- ◆ **\$6 Million (30/80 3-year money)**
- ◆ **Congressional sponsors:**
 - ◆ **Sen. Ben Nighthorse Campbell (R-CO)**
 - ◆ **Sen. Ted Stevens (R-AK)**
 - ◆ **Sen. Robert Byrd (D-WV)**

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 **ARCHER Hyperspectral Imaging (HSI)**

What Is ARCHER?

**Airborne
Real-Time
Cueing
Hyperspectral
Enhanced
Recon**



..... SeARCHERs' Edge

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ARCHER Hyperspectral Imaging (HSI)

- ◆ HSI is a technology that allows a sensor on a moving platform to detect and/or gather reflected radiation (light) from man-made or natural objects on the ground.
- ◆ Hyperspectral Imaging will support current and future CAP missions
 - ◆ Search and Rescue (SAR)
 - ◆ Counter Drug (CD)
 - ◆ Disaster Relief (DR)
 - ◆ Homeland Security (HLS)

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ARCHER Concept

Algorithms allow ARCHER to:

- ◆ Detect spectral anomalies (things that do not "belong")
 - ◆ Potential Missions: Search and Rescue, Disaster Relief
- ◆ Detect specific spectral signatures using matched filters (find things with known spectral properties)
 - ◆ Potential Missions: Drug Interdiction, HLS
- ◆ Detect changes over time
 - ◆ Potential Missions: HLS and Disaster Relief
- ◆ Algorithms are applied in real-time, and require little to no user input

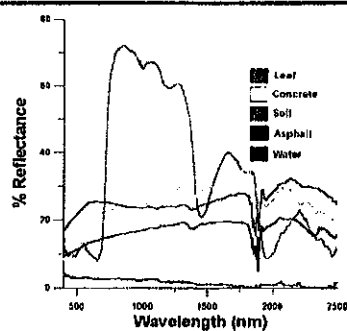
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HSI – Spectral Technologies

Examples of Hyperspectral Signatures



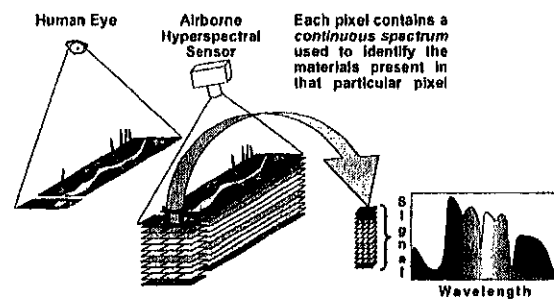
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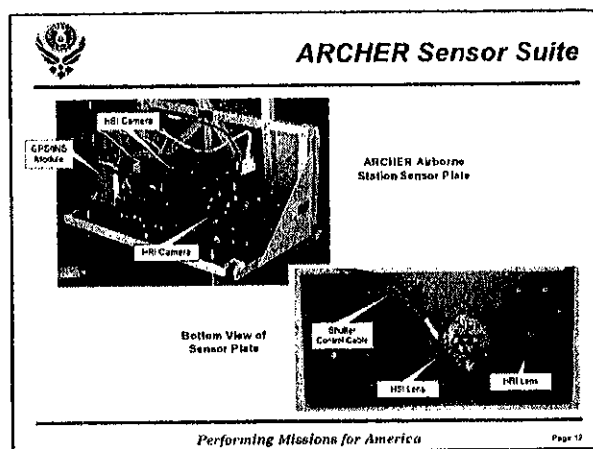
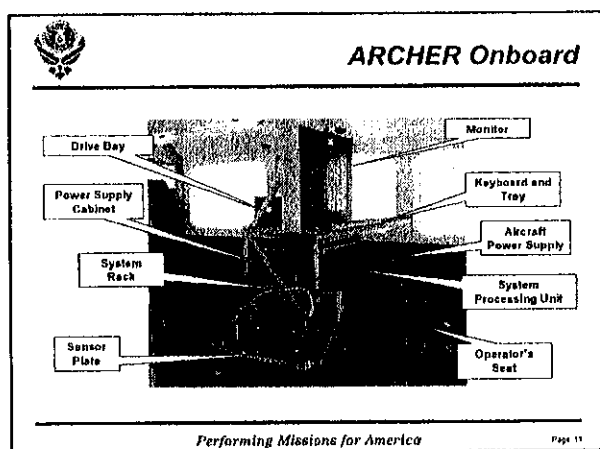
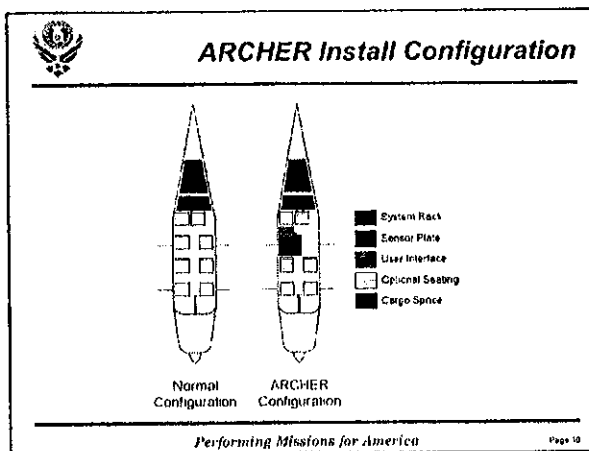
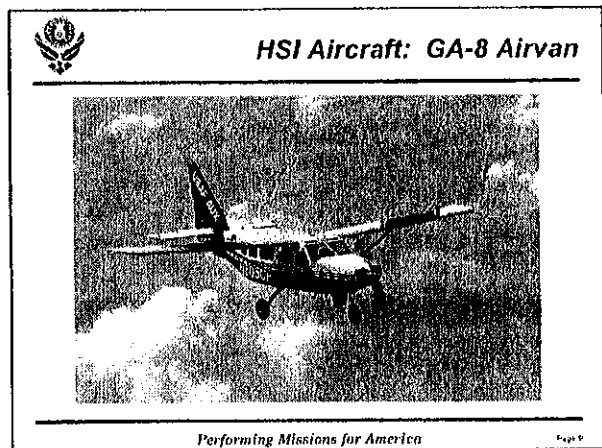
Mark 1 Eyeball vs. HSI

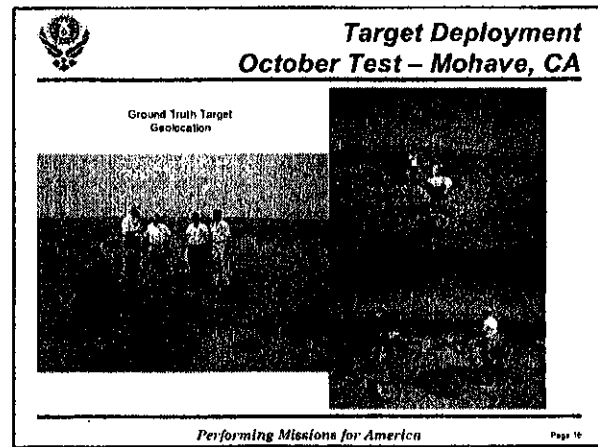
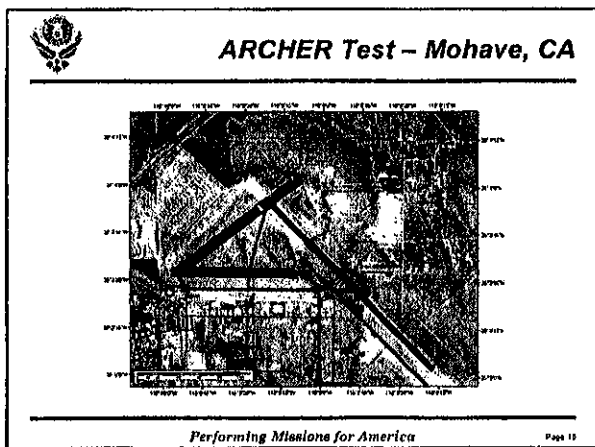
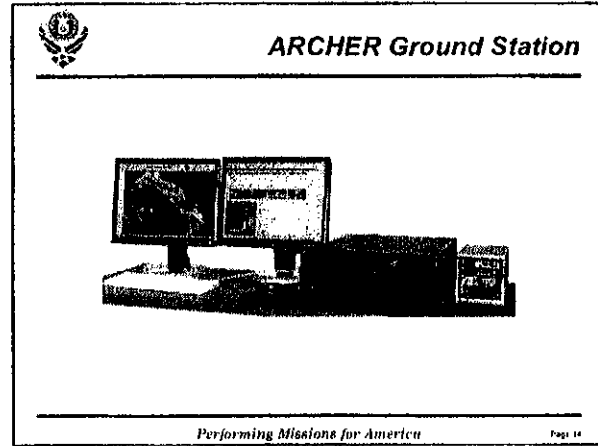
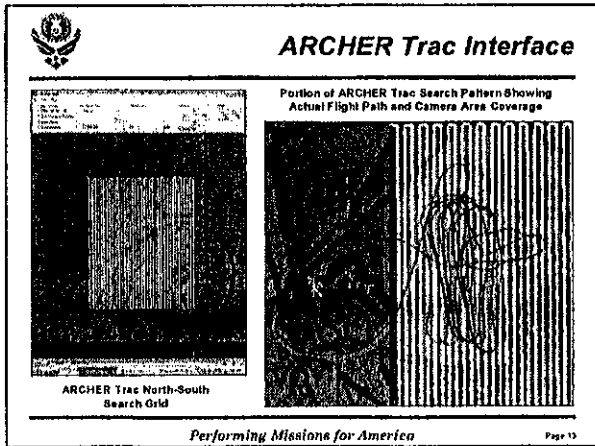
How HSI works:

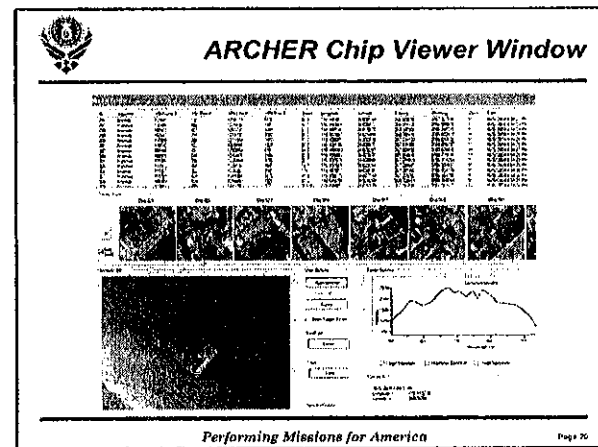
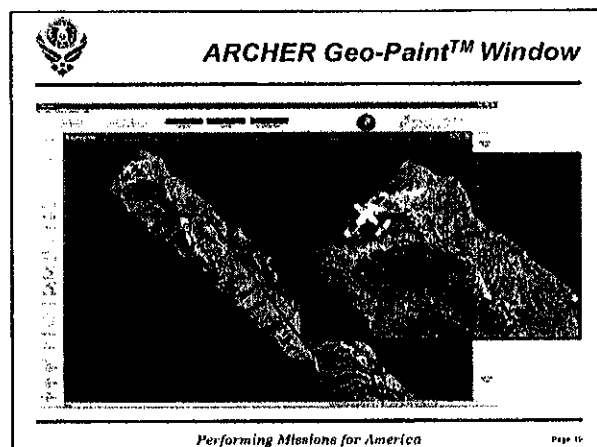
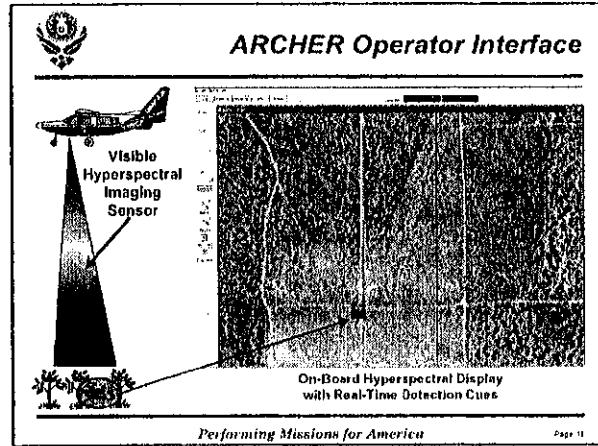
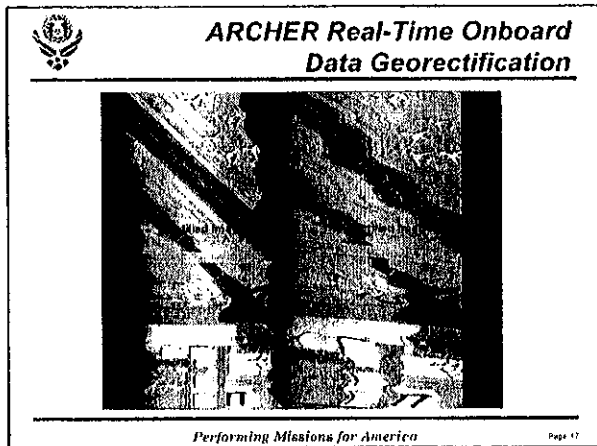


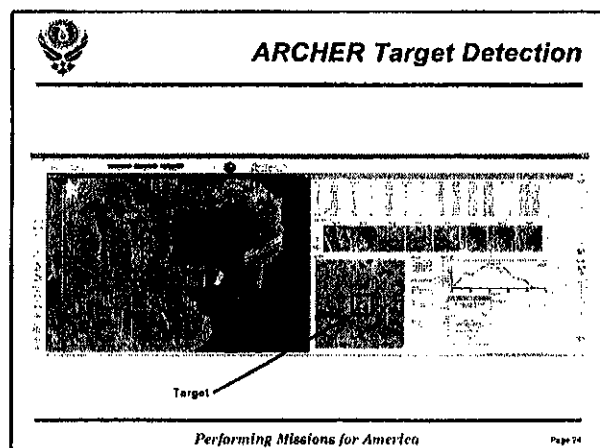
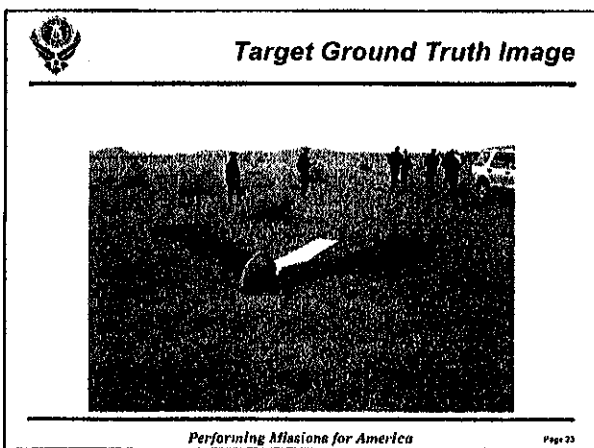
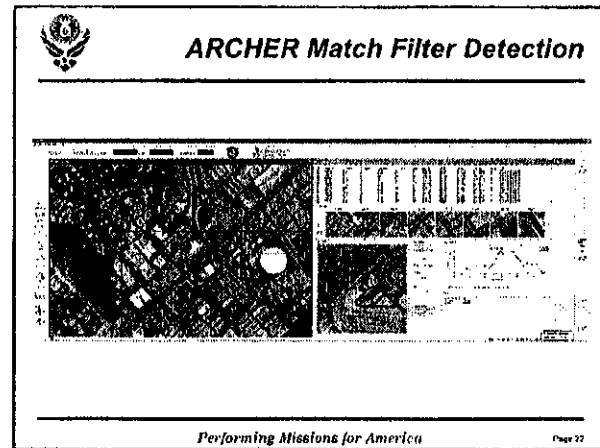
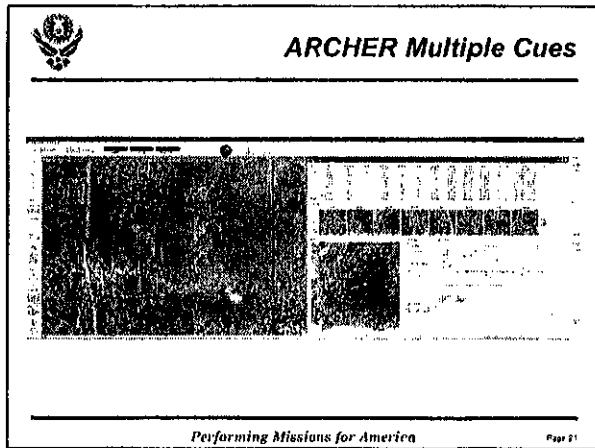
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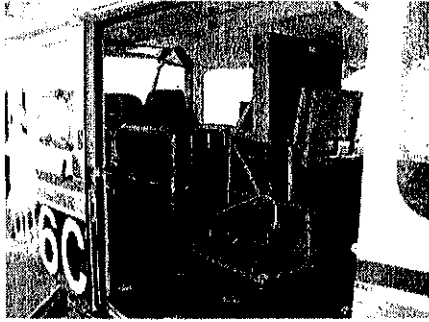








ARCHER with Ground Station (Packed)



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ARCHER Packed for Transport

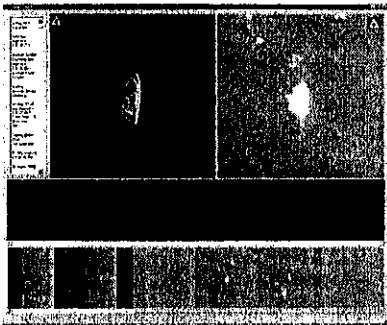


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ARCHER SAR Detections



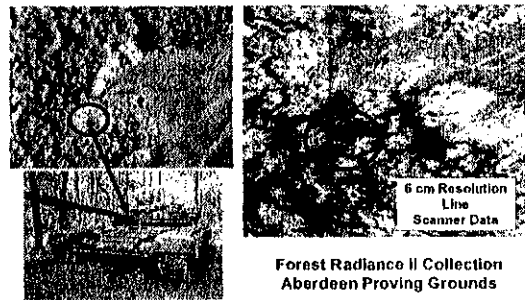
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Operational Impact-SAR

SAR – Hyperspectral: Target Detection




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HSI – Operational Impact – CD


CD - Hyperspectral: Counterdrug support



Ground Truth Imagery



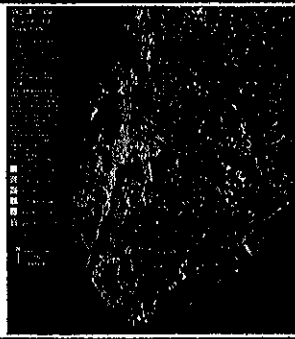
Marijuana Detections



Detections Overlaid on Imagery

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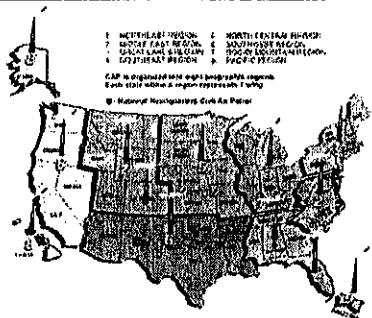
Operational Impact - DR



Analysis of Materials from Destruction of World Trade Center in New York

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HSI Airborne Asset Distribution



HSI Asset

1. NORTHWEST REGION 2. NORTH CENTRAL REGION
 3. SOUTHWEST REGION 4. SOUTH CENTRAL REGION
 5. PACIFIC REGION 6. ATLANTIC REGION
 7. SOUTHEAST REGION 8. MIDWEST REGION

Each state within a region represents 1 unit
 0 = National Headquarters Civil Air Patrol

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Partnership Support



◆ Air Force Research Lab (AFRL)




◆ Naval Research Lab (NRL)




◆ U.S. Coast Guard Research and Development Center

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VCN

What is VCN?

**Visual
Computing
Network**



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Visual Computing Network (VCN)


VCN is comprised of laptop computers loaded with BattleScape visualization software accompanied by satellite imagery and maps.

It also contains Jeppesen FlightStar for complete electronic flight planning.


The VCN provides:


- ◆ Mission Familiarization, Planning & Rehearsal utilizing unclassified satellite and aerial imagery
- ◆ 3D fly through capabilities
- ◆ Situational awareness for flight and ground operations
- ◆ Electronic Flight Planning

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SLC Satellite Imagery

**Salt Lake City
30m Satellite
Imagery:
Lower
Altitude View
Using HUD**



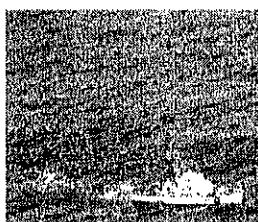


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SDIS

What is SDIS?

**Satellite
Digital
Imaging
System**



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Satellite Digital Imaging System (SDIS)

- ◆ Satellite Digital Imaging is a technology that enables CAP to send high resolution digital imagery from CAP aircraft to anyone anywhere in the world who has e-mail access.
- ◆ Images are sent as JPEG attachments via standard e-mail to multiple addresses and/or VMIRS at the same time (point to multi-point).
- ◆ Imagery is transmitted near real-time. Files of 100K take less than 2 minutes to transmit.



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Satellite Digital Imaging System

Aircraft Components

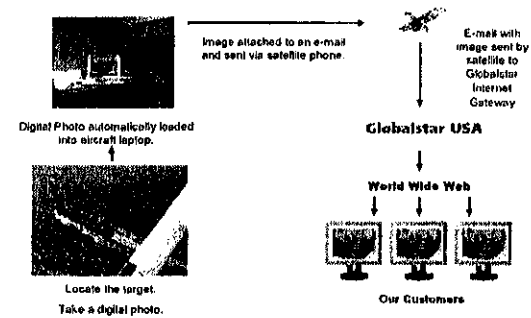


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Satellite Digital Imaging System



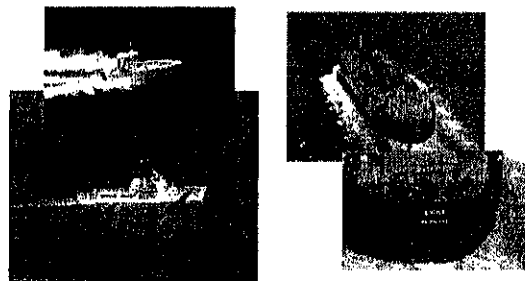
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Satellite Digital Imaging System

Sample Photos




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 **Satellite Digital Imaging System**

◆ **Coverage Map**


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 **Operational Demonstration**

SDIS Demo to General Eberhart, USNORTHCOM/CC

Key West, Florida


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 **SDIS Mission Success**

◆ **Actual USCG Mission**
◆ **SDIS Imagery of Cuban Refugees at Sea**

Key West, Florida
25 April 2003

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 **Summary of Technology Benefits**

ARCHER, VCN and SDIS Programs will add new technological dimensions to CAP's capabilities resulting in:

- ◆ Increased detection capabilities for all missions (SAR, CD, DR and HLS)
- ◆ Better situational awareness
- ◆ Comprehensive mission planning and rehearsal
- ◆ Point to multi-point high resolution digital imagery transmission from aircraft
- ◆ Increased safety
- ◆ Technological interoperability with other organizations
- ◆ CAP positioned as a leading national airborne HSI asset

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Notable Comments



"Take all the technology assets we have in Government and elsewhere and use them in such a way, fuse the information in such a way, share the information in such a way that we can hopefully prevent future terrorist attacks."

SECRETARY TOM RIDGE
Secretary of Homeland Security

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Notable Comments

"All breakthrough technologies are critical to the Air Force in maintaining information superiority. I am convinced that hyperspectral sensor systems have the potential of providing revolutionary enhancements to our information systems and will facilitate the transformation of our intelligence, surveillance and reconnaissance (ISR) program."



GENERAL JOHN P. JUMPER
Chief of Staff, United States Air Force

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Just the beginning...



Thank You

Col Drew Alexa, CAP
National Coordinator
Advanced Technologies

<http://atg.cap.gov>

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Civil Air Patrol Foundation

**U.S. AIR FORCE
AUXILIARY**



Civil Air Patrol Foundation

- ◆ Organized as nonprofit 501(c)(3)
- ◆ Purpose: To promote and support CAP and its missions



Civil Air Patrol Foundation

- ◆ Benefits
 - ◆ Can appoint "large" donors to Board of Directors (gift continuity)
 - ◆ Good vehicle for "planned giving"
 - ◆ Can select CAP programs to fund
 - ◆ Can independently establish scholarships for CAP activities
 - ◆ Can apply for United Way & Combined Federal Campaign listing (current Corp. can't)
 - ◆ ".org", not a ".gov" organization



Civil Air Patrol Foundation

- ◆ Board of Directors
 - ◆ National Commander -- ex officio
 - ◆ National Vice Commander -- ex officio
 - ◆ National Finance Officer -- ex officio
 - ◆ May increase number provided majority are CAP members
 - ◆ Meets at Annual National Conference
 - ◆ Appoints new directors (other than ex officio members)



Civil Air Patrol Foundation

- ◆ Officers - Elected annually by Board of Directors
 - ◆ President
 - ◆ Vice President
 - ◆ Secretary
 - ◆ Treasurer



Civil Air Patrol Foundation

- ◆ Initial expenses
 - ◆ Filing fees (nominal)
 - ◆ Bookkeeping software
 - ◆ Web site development and hosting
 - ◆ Foundation Executive Director (Part time)
- ◆ Recommend that BoG approve establishment of Civil Air Patrol Foundation

Headquarters U.S. Air Force Auxiliary

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Repeater Requirements Study

Lt Col Maurice Thomas

U.S. AIR FORCE
AUXILIARY



Task

Determine our true repeater requirements so we can lay out a plan to execute the \$5.8 Million the AF has given CAP



Process

- ♦ Wing Driven Proposals
- ♦ Region Review
 - ♦ Region Repeater Coordination Groups
- ♦ National Approval
 - ♦ National Repeater Coordination Group
 - ♦ Formed by NEC - Two reps from each region
- ♦ NEC/NB adoption of plan
- ♦ Presentation to CAP-USAF for amendment to Comm TA
- ♦ Request for frequency assignment



Civil Air Patrol Repeater Application and Review System

U.S. AIR FORCE AUXILIARY / CAP / CAPUSAF / CAPUSAF / CAPUSAF

Repeater Site Application

When you enter a new repeater site, you must first create a new site in the system. This is done by clicking on the "New Site" button in the top right corner of the page.


Project: [Text Box] Status: [Text Box]

Location: [Text Box] City: [Text Box] State: [Text Box] Zip: [Text Box]

Frequency: [Text Box] Band: [Text Box] Mode: [Text Box] Power: [Text Box]

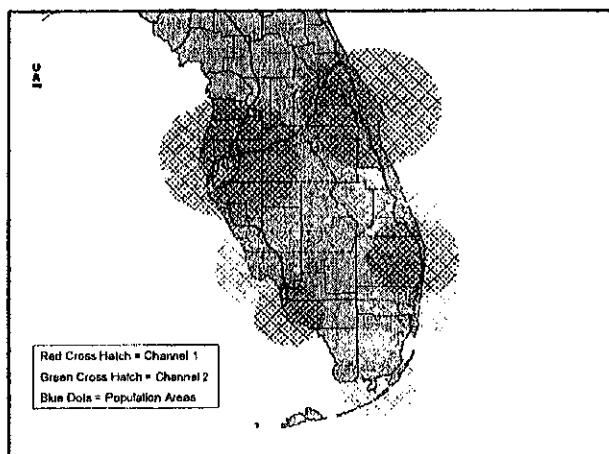
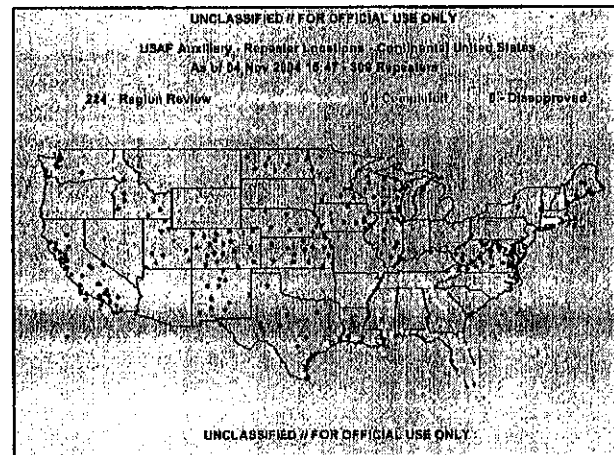
Comments: [Text Box]


Submit [Text Box] Cancel [Text Box]



Status

- ◆ 309 Proposals in the system
- ◆ 224 Awaiting Region Approval
- ◆ 85 Awaiting National Approval
- ◆ Request for clearer justification guidance
 - ◆ New guidance coordinated with CAP-USAF
 - ◆ Published first week of Nov
- ◆ General Wheless' granted extension of the process until 30 Nov





Prognosis

- ◆ Goal: All proposals settled by Winter Board

